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OPERATING SUMMARY

MARKHAM

WATER POLLUTION CONTROL PLANT

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MINISTRY OF THE ENVIRONMENT

Lab

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MARKHAM
WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF MARKHAM

by the

MINISTRY OF THE ENVIRONMENT

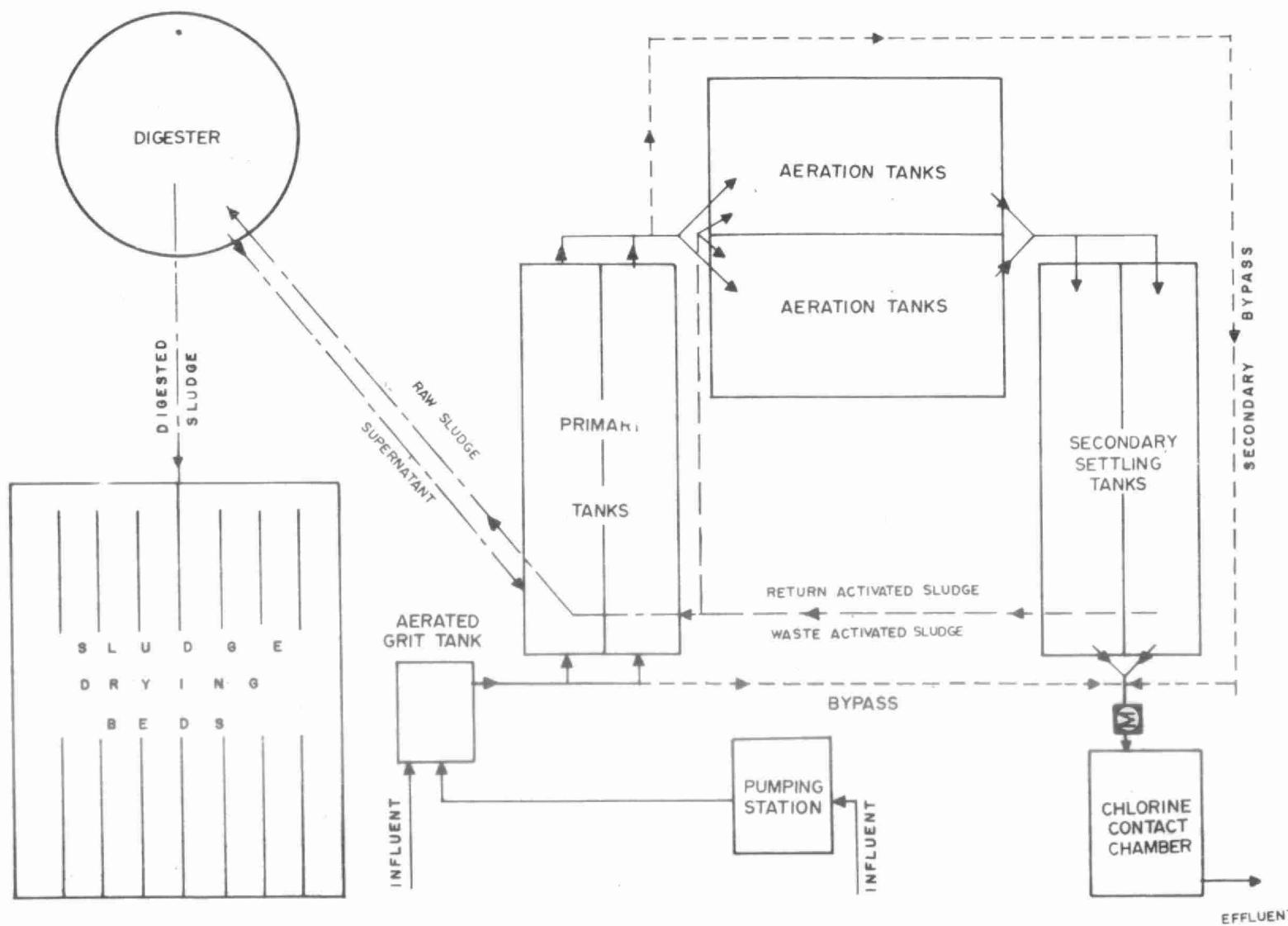
1973 ANNUAL OPERATING SUMMARY

prepared by
Plant Performance Unit
TECHNICAL SERVICES BRANCH
T. Cross, Director

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TOWN OF MARKHAM
WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT Town of Markham WPCP

PROJECT NO. 2-0040-59

TREATMENT Activated Sludge

DESIGN FLOW 0.67 mgd

DESIGN POPULATION 8,000

BOD - Raw Sewage 215 mg/l
- Removal 95%

SS - Raw Sewage 220 mg/l
- Removal 95%

PUMPING STATION

Type: Fairbanks-Morse
Size: Two 350 gpm @ 40' tdh

PRIMARY TREATMENT

Comminution

Type: C.P. Barminutor
Size: One 18"

Grit Removal

Type: Aerated
Size: One 13' x 6' x 8.1' swd
(4,240 gal)
Retention: 9.2 min

Primary Sedimentation

Type: Jeffrey
Size: Two 42' x 12' x 7' 9" (avg)
(48,800 gal)
Retention: 1.76 hours
Loading: Surface, 660 gal/ft²/day
Weir, 27,800 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, two pass
Size: One 51'x22'x15' plus one
51'x28'x15' (38,250 cu.
ft. or 239,000 gallons

Air Supply

Type: Sutorbilt and Aerzen
Size: One 700 scfm @ 5 psi (standby)
One 1075 scfm

Diffusers

- 72 spargers (17" centre)

Secondary Sedimentation

Type: Jeffrey
Size: Two 42' x 12' x 10.5' (avg)
(66,000 gal)
Retention: 2.38 hours
Loading: Surface, 660 gal/ft²/day
Weir, 4,750 gal/ft/day

CHLORINATION

Type: W & T
Size: One 70 lb/day

Chlorine Contact Chamber

Size: 20' x 11.38' x 8.5' swd (12,080 gal)
Retention: 26 min

OUTFALL

- to Exhibition Creek
(tributary of Rouge River)

SLUDGE HANDLING

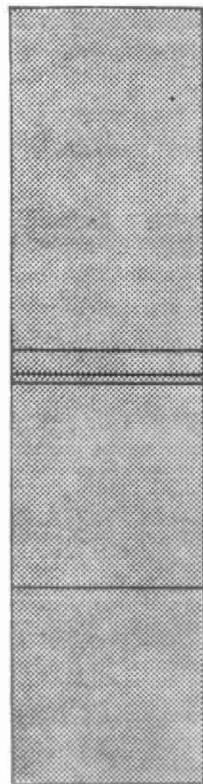
Digestion System - Single-stage

Type: Mixed by recirculation
Size: One 45' dia x 20' swd (34,240 cu ft
or 220,000 gal)
Loading: 0.67 lb/cu ft/ mo

Sludge Drying Beds

Size: Four 90' x 20' (7,200 sq ft)

ANNUAL COSTS



1973 OPERATING COSTS

SALARIES & WAGES	44 %
EMPLOYEE BENEFITS	3 %
TRANSPORTATION & COMMUNICATIONS	1 %
SERVICES	25 %
SUPPLIES & EQUIPMENT	26 %
AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	NIL
TRANSFER PAYMENTS	NIL
OTHER TRANSACTIONS	NIL

YEARLY OPERATING COSTS

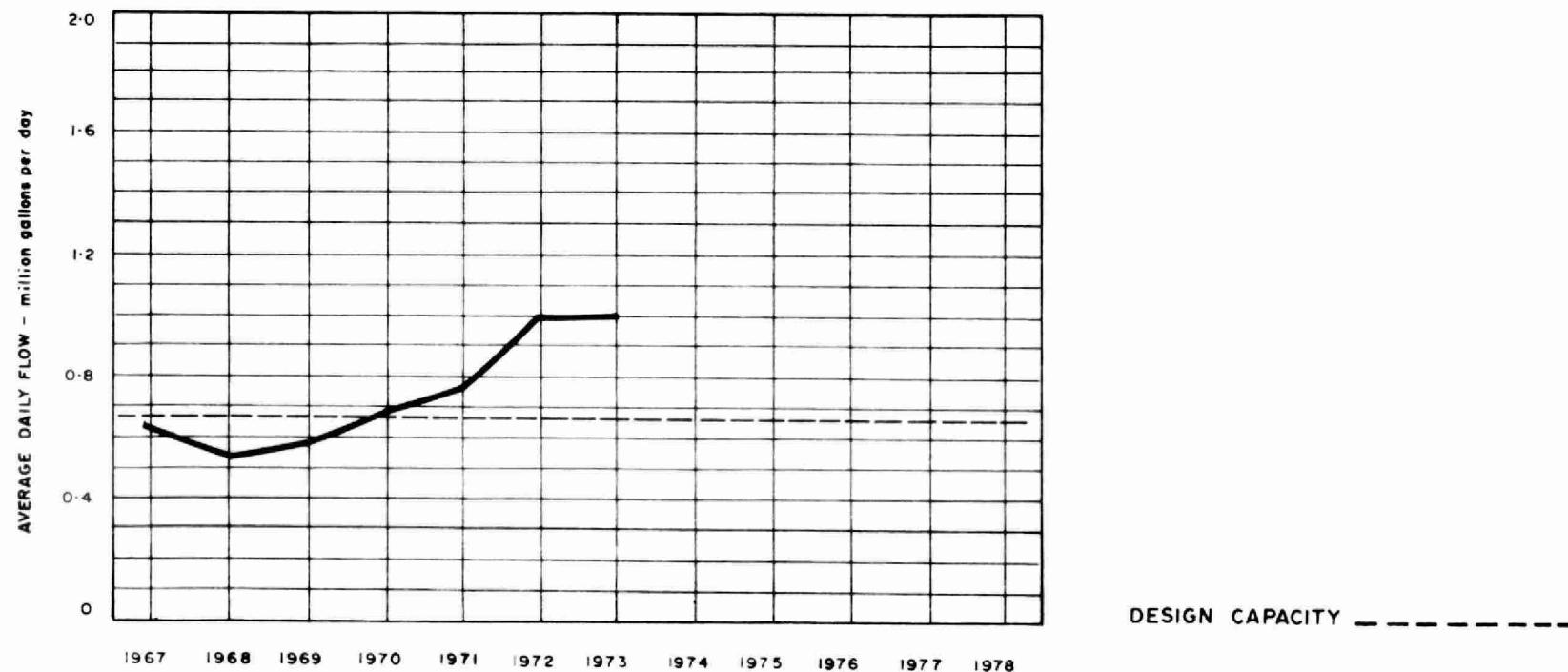
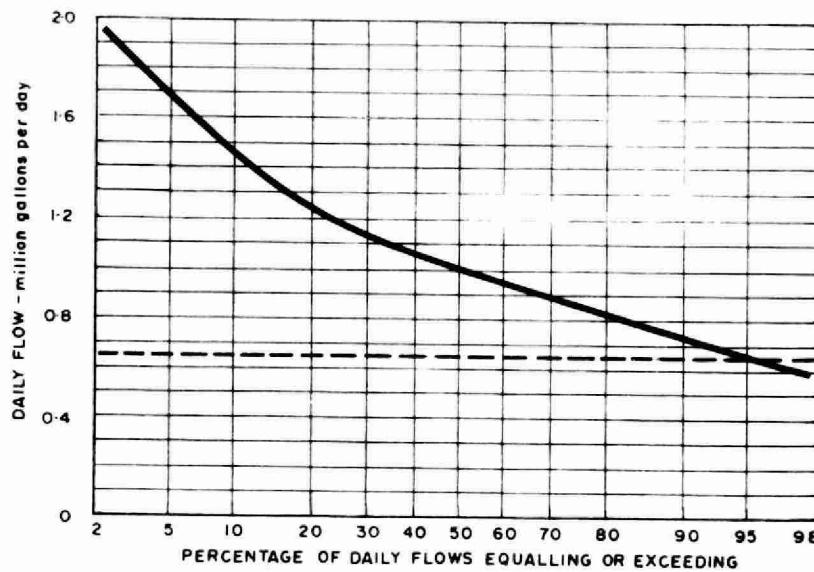
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS	
			\$/M.G.	¢/lb BOD
1968	204	\$ 21,533	105	12
1969	217	29,099	134	9
1970	249	36,428	146	9
1971	280	43,581	156	4
1972	366*	45,923	125	11
1973	359	50,232	140	12

* Estimated

OPERATING EXPENDITURES

SALARIES AND WAGES	\$22,158
EMPLOYEE BENEFITS	1,425
TRANSPORTATION & COMMUNICATIONS	633
SERVICES	12,808
SUPPLIES AND EQUIPMENT	13,208
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	0
TRANSFER PAYMENTS	0
OTHER TRANSACTIONS	0
TOTAL	\$50,232

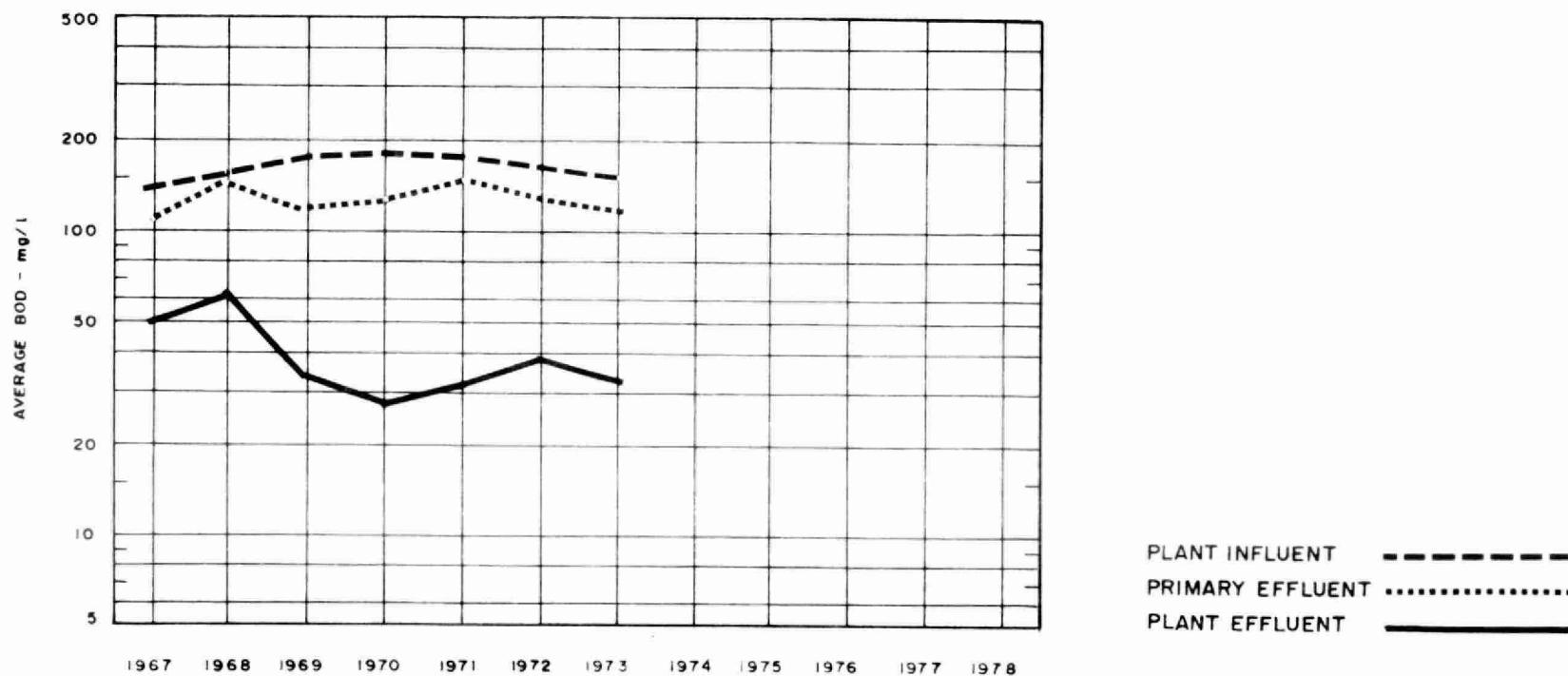
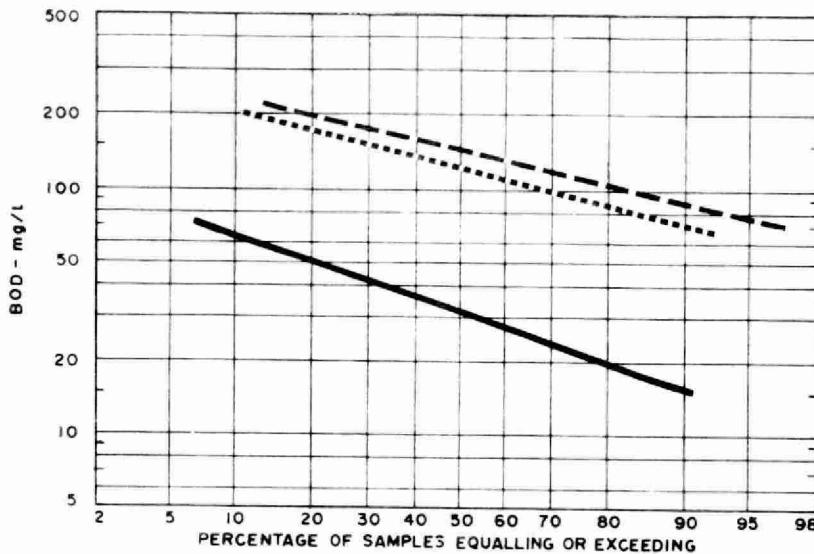
PROCESS DATA FLOWS



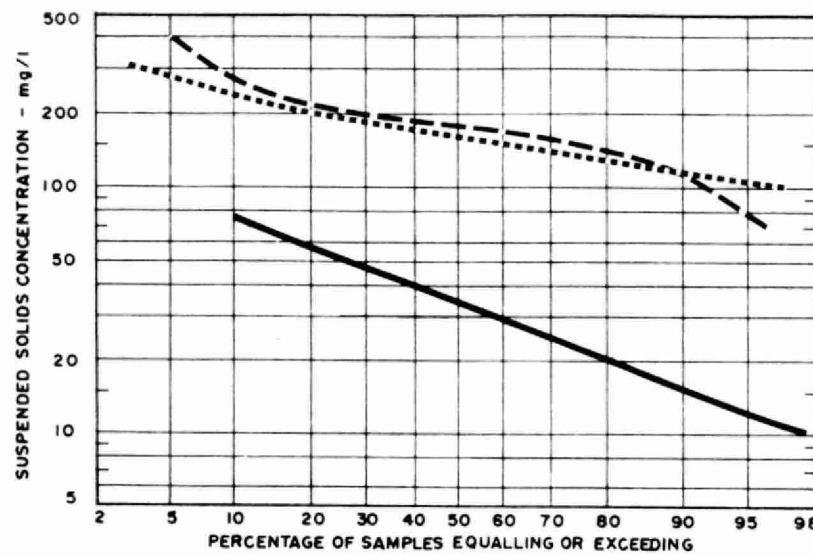
PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10 ³ pounds			%	10 ³ pounds		
JAN	29.7	0.96	1.21	130	24	82	32	160	35	79	38	11.0	2.8
FEB	25.1	0.90	1.50	170	15	91	38	120	42	66	21	10.0	3.8
MAR	40.0	1.29	2.00	140	26	82	48	220	23	89	77	8.2	3.3
APR	37.0	1.23	2.00	95	35	63	22	180	42	77	51	8.2	4.2
MAY	30.6	0.99	1.61	160	26	84	41	200	30	85	50	8.3	5.3
JUNE	26.6	0.89	1.06	120	32	74	24	160	53	67	28	9.5	6.2
JULY	24.0	0.78	0.93	230	63	73	40	200	40	79	37	9.8	5.8
AUG	24.6	0.79	1.02	140	33	75	26	140	13	91	31	7.9	4.7
SEPT	25.1	0.80	0.96	200	67	67	33	340	60	82	69	9.6	6.3
OCT	27.2	0.88	1.27	150	39	74	30	160	38	76	33	8.9	6.4
NOV	28.7	0.96	1.26	180	22	88	45	180	18	90	48	8.9	4.9
DEC	40.4	1.30	1.46	80	26	68	22	140	25	82	46	7.9	3.9
TOTAL	359.0	-	-	-	-	-	401	-	-	-	529	-	-
AVG.	29.9	1.00	MAXIMUM 2.00	150	33	78	33	180	35	81	44	9.1	4.7
No. of Samples	-	-	-	26	26	-	-	26	26	-	-	26	26

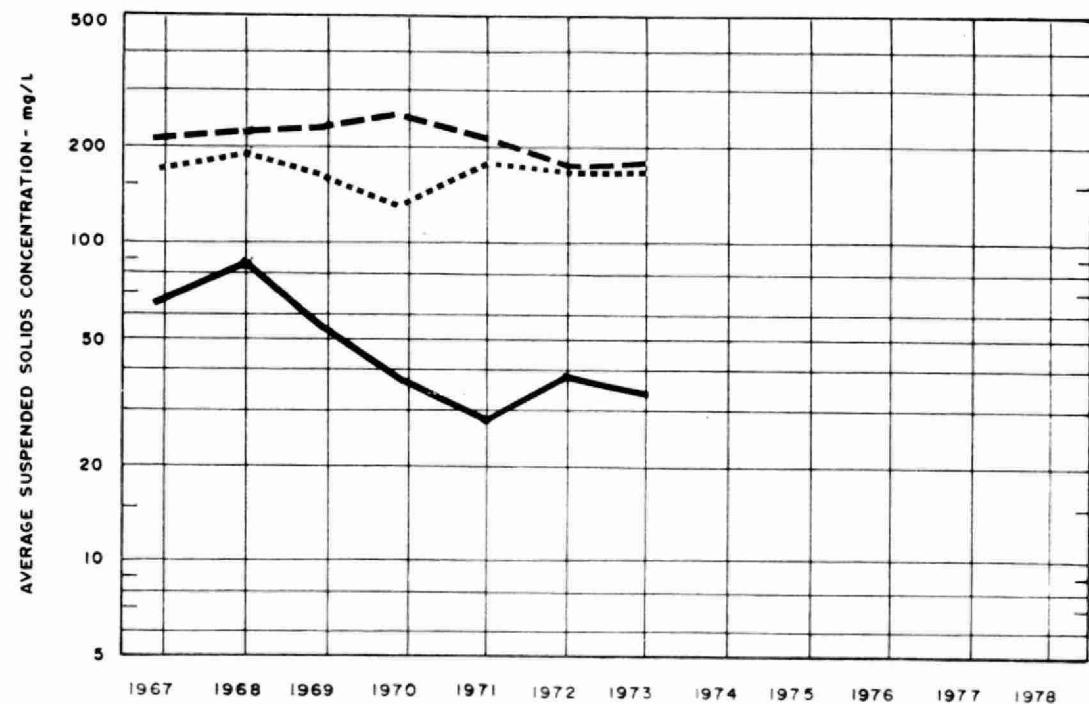
BIOCHEMICAL OXYGEN DEMAND



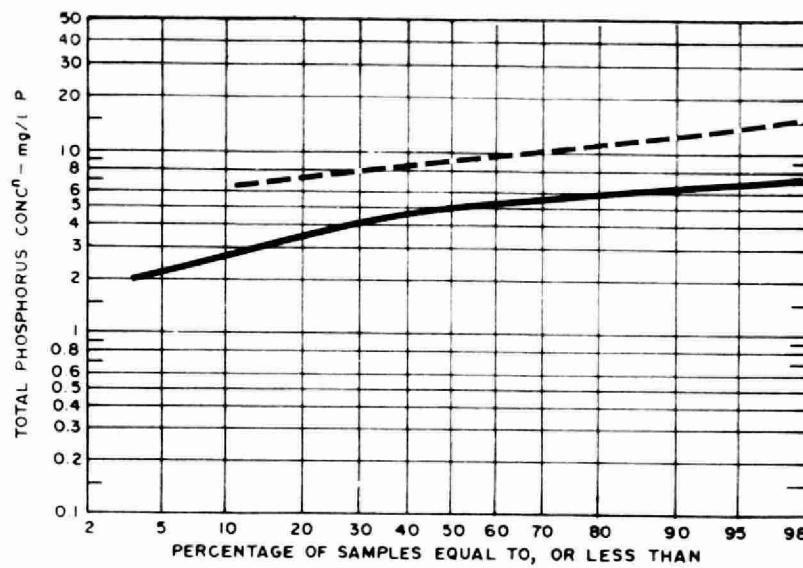
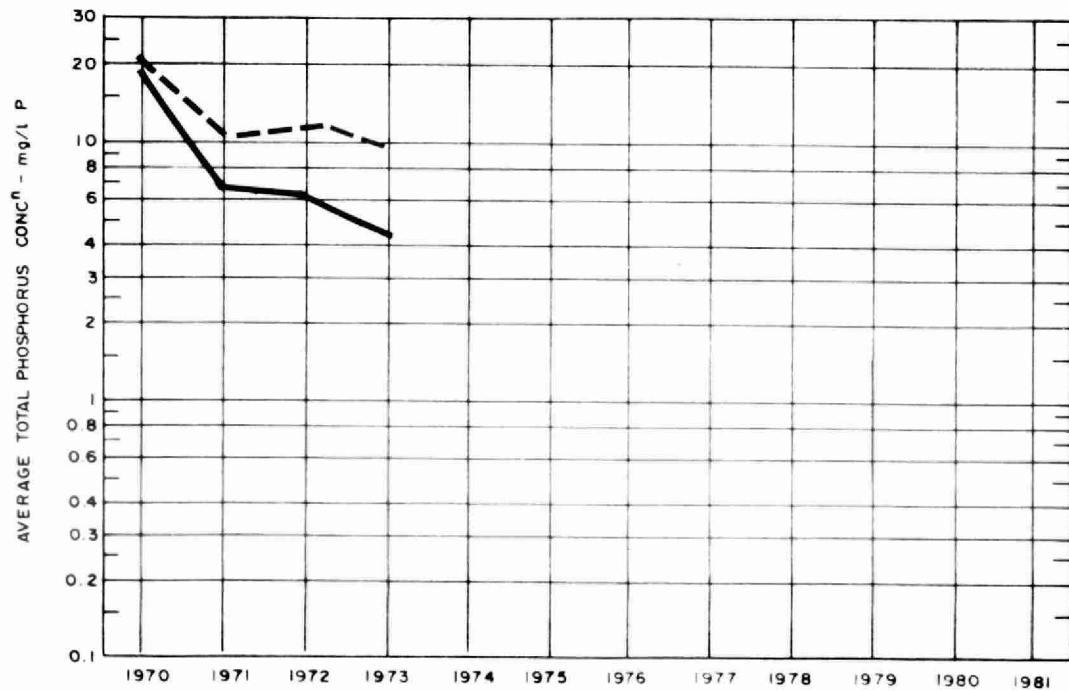
SUSPENDED SOLIDS



PLANT INFLUENT
PRIMARY EFFLUENT
PLANT EFFLUENT



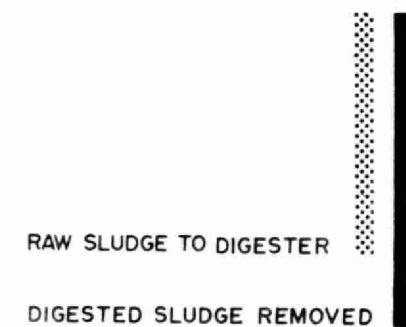
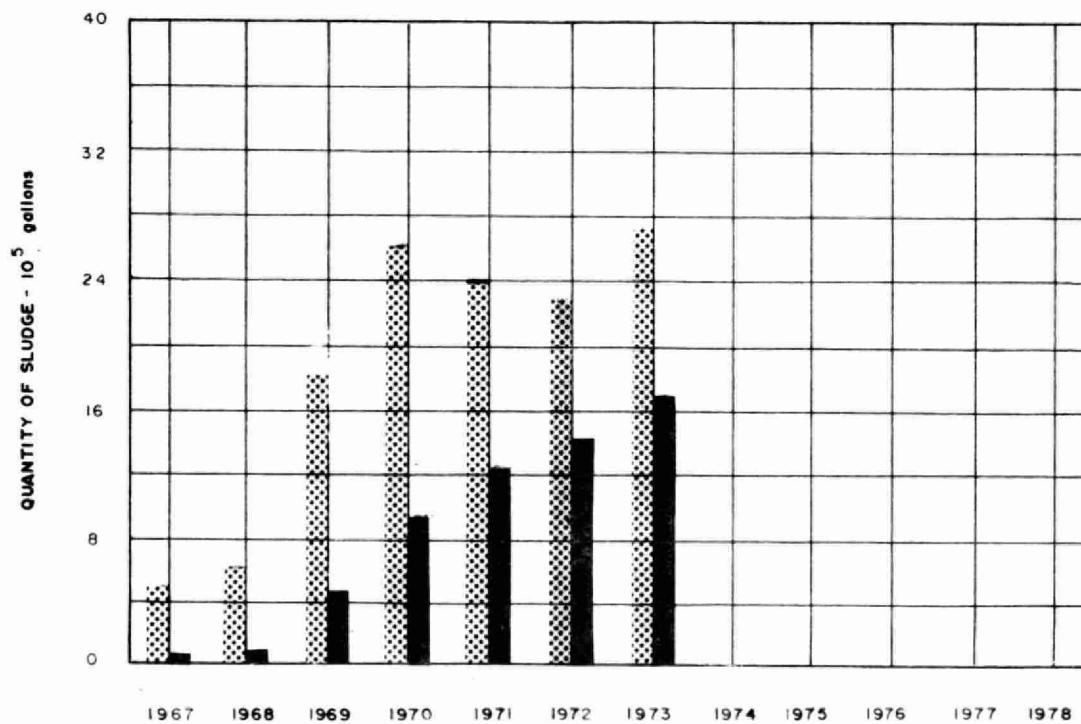
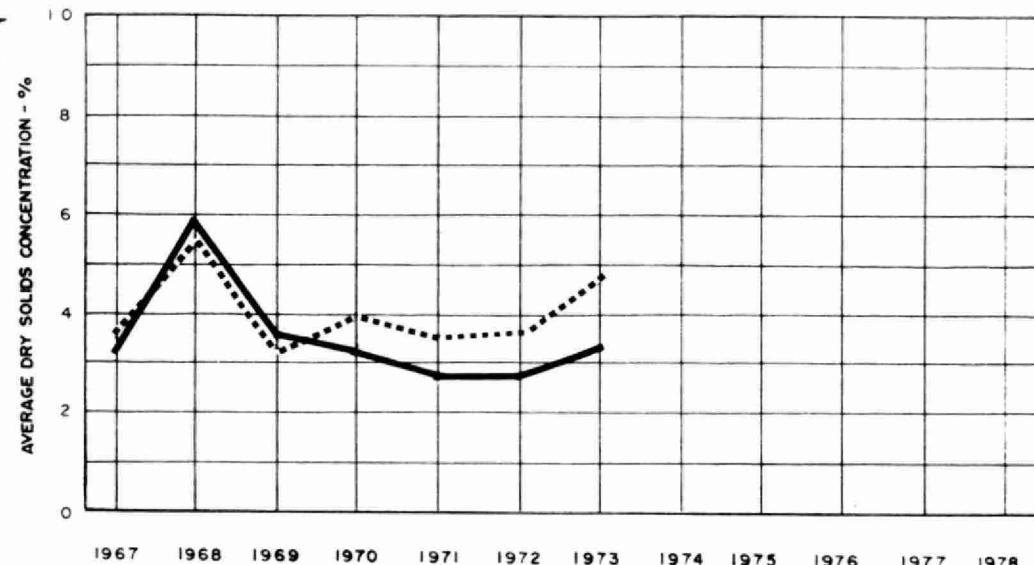
PHOSPHORUS



PLANT INFLUENT ——————
PLANT EFFLUENT ——————

DIGESTION

RAW SLUDGE
DIGESTED SLUDGE —————



TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
		QUANTITY REMOVED cubic feet	CL ₂ USED ^{10³} pounds	Avg DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day ⁻¹	AIR 1000 ft ³ lb BOD	RAW SLUDGE		DIGESTED SLUDGE		SUPER- NATANT T.S.	AMOUNT HAULED cubic yards	
										QUANTITY ^{10⁵} gallons	TOTAL SOLIDS %	VOL SOLIDS %	QUANTITY ^{10⁵} gallons	TOTAL SOLIDS %	VOL SOLIDS %	
JAN	65	1.3	4.3	86	170	1300	0.20	5.8	2.4	7.7	42	1.4	4.6	34		843
FEB	50	1.1	4.1	100	140	1300	0.23	2.9	2.2	6.7	42	1.5	6.2	26		866
MAR	142	1.2	3.0	85	140	2100	0.12	3.9	2.2	9.4	60	1.1	6.6	29		676
APR	90	1.2	3.2	87	200	2300	0.10	3.6	2.2	5.5	49	1.0	4.6	33		540
MAY	100	1.2	3.9	180	280	1500	0.33	1.7	2.4	4.0	58	1.7	2.0	40		998
JUNE	90	1.1	4.4	140	210	1400	0.27	2.2	2.2	3.4	63	1.5	3.1	48		878
JULY	80	1.2	4.8	160	170	1000	0.47	2.1	2.2	2.4	68	1.4	2.2	52		831
AUG	100	1.3	5.1	130	170	1200	0.31	2.6	2.6	3.3	68	1.6	2.3	53		939
SEPT	75	1.3	5.2	200	180	1200	0.60		2.2	3.7	68	1.4	2.1	55		854
OCT	105	1.2	4.5	140	140	1100	0.36	2.3	2.1	3.4	66	1.6	2.1	55		950
NOV	75	1.1	4.0	140	160	1800	0.21	2.4	2.2	3.8	69	1.7	2.1	54		1014
DEC	75	1.2	2.9	75	140	800	0.03	5.0	2.3	4.3	71	1.5	2.2	53		897
TOTAL	1047	14.2	-	-	-	-	-	-	27.2	-	-	17.4	-	-	-	10286
AVG.	2.9 <small>cu.ft./mil gal</small>	1.2	4.0	130	170	1400	0.27	3.1	2.3	4.8	60	1.5	3.3	44		857

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